Double Integration Practice: Switching Order of Integration

Switch the order of the following double integrals, evaluating any integral where the integrand is actually specified. Always sketch the region of integration!

1. \( \int_0^2 \int_{x/2}^1 f(x, y) \, dy \, dx \)

2. \( \int_0^1 \int_2^{4-2x} f(x, y) \, dy \, dx \)

3. \( \int_0^1 \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} f(x, y) \, dy \, dx \)

4. \( \int_0^1 \int_{y^{1/3}}^{y/2} f(x, y) \, dx \, dy \)
5. $\int_{\ln 10}^{10} \int_{e^x}^{10} \frac{1}{\ln y} \, dy \, dx$

6. $\int_0^\pi \int_0^\pi \frac{\sin y}{y} \, dy \, dx$

7. $\int_0^2 \int_{4-x^2}^{4} \frac{xe^{2y}}{4-y} \, dy \, dx$

8. $\int_0^{2\sqrt{\ln 3}} \int_{\sqrt{\ln 3}}^{\sqrt{\ln 3}} e^{x^2} \, dx \, dy$